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## Breeding of the Japanese Murrelet *Synthliboramphus wumizusume* in South Korea

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The global population of Japanese Murrelet *Synthliboramphus wumizusume* is believed to number only 4,000–10,000 birds, and owing to a rapid population decline the species has been designated as Vulnerable on the IUCN Red List (Carter *et al.* 2002, BirdLife International 2011, IUCN 2011). Almost all of the population breeds on uninhabited rocky islands in Japan, mainly in Kyushu and on the Izu Islands, between mid-February and early May (BirdLife International 2001, Carter *et al.* 2002). There is also

**Figure 1.** Map of South Korea and the locations of (A) Daegugul Island, (B) Dok Island, and (C) Jeju Island.



evidence of breeding in Russia: a dead juvenile was found in Boysman Bay in July 1984 (BirdLife International 2001).

In South Korea, breeding was first recorded at Daegugul Island (Daeguguldo), Shinan county, Jeollanam province, off the southwest coast of South Korea (Figure 1): three breeding pairs were found here for the first time on 10 May 1983 (*Kyunghyang Shinmun* 1983, Won 1992). The Korean Government designated Daegugul Island as National Monument no. 341 in 1984 for the protection of breeding seabirds, and designated the species itself as no. 450 in March 2005.

Subsequent records in both breeding and non-breeding seasons were restricted to the south coast of South Korea (Park 2002, Oh 2004) until the discovery of a second breeding site: Dok Island (Dokdo), Ulleung county, Gyeongsangbuk province. Dok Island is located in the East Sea (Sea of Japan), c.220 km from mainland South Korea, and is composed of two main islands (Dong Island and Seo Island) and dozens of small islets (Figure 1). On 28 May 2005, an adult and a chick were found dead on Dong Island (37°14'21"N 131°52'07"E) and Seo Island (37°14'35"N 131°51'53"E), respectively, by YSK. The dead adult was lying on the shore and the dead chick was floating on the sea with its head pecked by an unknown predator (Figure 2a; Kwon & Yoo 2005). In 2009, a fledgling and two adults were filmed leaving the island at night by the Seoul Broadcast System in a programme entitled *Dokdo, Saengmyeong-ui Ddang* [Dok Island, the Land of Life] (see [http://www.pandora.tv/video.ptv?c1=08&c2=0175&ch\\_userid=loveasia&prgid=39061826](http://www.pandora.tv/video.ptv?c1=08&c2=0175&ch_userid=loveasia&prgid=39061826) and [http://www.pandora.tv/video.ptv?c1=08&c2=0175&ch\\_userid=loveasia&prgid=39061822](http://www.pandora.tv/video.ptv?c1=08&c2=0175&ch_userid=loveasia&prgid=39061822)). Subsequently, a dead adult was found on Dong Island on 15 July 2010 by JYP. These records suggest that Japanese Murrelet breeds on the island, although active nests have not yet been found.

Here, we report a third breeding area of this species in South Korea: Jeju Island in Jeju Special Self-Governing Province (hereafter 'Jeju province'), which is the southernmost island in South Korea (Fig. 1). The possibility of Japanese Murrelet breeding on Jeju Island was anticipated owing to regular observation of adults during the breeding season at sea between Gapa and Mara Islands south-west



**Figure 2.** Japanese Murrelet: (a) a dead chick found on Dok Island on 28 May 2005; (b) a chick on Jeju Island on 29 April 2011; and (c) an adult and two juveniles on Jeju Island on 25 May 2011.

of Jeju Island: one individual in May 2006, five in March and 14 in May 2007 (Kim 2008); ten in April and seven in May 2008 (Kim *et al.* 2010); one in April and five in May 2009 (CWK); one in April and two in May 2010 (CWK); and five in April and three in May 2011 (DWK).

Breeding was suspected when two *Synthliboramphus* chicks were observed for a few seconds by HJK and CWK on the coast at 33°11'51"N 126°17'43"E from a boat heading to Mara Island, but no photographs were obtained. No adults were seen nearby, so it was not possible to determine if the chicks were Japanese or Ancient Murrelet *S. antiquus*. The latter breeds in South Korea, but it is not known from Jeju Island during the breeding season (Kim *et al.* 2011). Finally, breeding of Japanese Murrelet on Jeju Island was confirmed on 29 April 2011 when DWK identified a live Japanese Murrelet chick on the coast of Seogwipo city at 33°14'21"N 126°36'32"E (Figure 2b). The identification was based on the dark upperparts contrasting with the white underparts and the dark cap contrasting with white cheeks and throat (Ancient Murrelet chicks have dark cheeks with some white behind the eye: Harrison 1983). The chick appeared to be a few days old; it was very small and covered with down. It was observed from 10h40 to 11h40

swimming along the shore, occasionally attempting but failing to jump up onto rocks. Murrelet chicks typically stay with adults at sea after fledging (del Hoyo *et al.* 1996), but no adults were seen. The chick may have become separated from the adults during fledging, or the latter may have been predated (e.g. by Peregrine Falcon *Falco peregrinus*). The chick was not observed the next day, despite searching the southern coast of Jeju Island. Subsequently, on 25 May 2011, one adult and two juveniles were seen and photographed by CWK at sea between Gapa and Mara Islands at 33°8'13"N 126°15'E (Figure 2c). The juveniles appeared older than the chick observed in April, based on their size and head pattern.

These observations confirm breeding around Jeju Island, but it is still unknown how many of the islands in Jeju province support breeders, or how large the population is. Similarly, surveys are required on Dok Island. On Daegugul Island, surveys in April 2006 by HJK recorded a mixed flock of Japanese and Ancient Murrelet numbering c.200 individuals, but in unknown proportions (Kim 2006). Subsequent surveys on Daegugul Island have been mainly focused on Swinhoe's Storm-petrel *Oceanodroma monorhis* (Lee *et al.* 2010). Therefore, surveys of all three known sites are required as a prerequisite for conservation and management.

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# An intraspecific adult killing in female Japanese Great Tits *Parus major minor*

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## Introduction

Intraspecific killing has been documented in a wide variety of avian taxa. Adults sometimes kill eggs and chicks of conspecifics when birds are competing for nesting sites (Belles-Isles & Picman 1986, Stanback & Koenig 1992, Inoue *et al.* 2010) or when birds are expanding their territories (Lee *et al.* 2011). Parents may also practise infanticide in cases of intraspecific brood parasitism when they identify parasitic chicks (Shizuka & Lyon 2010). In species that practise obligate brood reduction, the death of the victim is normally caused by a sustained assault by an older nestling and its evolution is concentrated in four orders: Gruiformes, Pelecaniformes, Accipitriformes and Sphenisciformes (Mock & Parker 1997, Simmons 2002).

Fighting among adults is also common, but there are few instances where birds have been observed to fight to the death, especially in small passerines. Direct observations of intraspecific killing between adults suggest that it can occur to provide food (i.e. cannibalism, Anderson 2004) or in response to nest-site competition (Flux & Flux 1992). However, the scarcity of reports

means that there is a need for more observations of fighting between adults which result in death of one individual. This would lead to greater understanding of the conditions under which such events occur. In this paper, we report a case of intraspecific killing in Japanese Great Tits *Parus major minor*, providing a direct observation in which an adult female attacked and killed another adult female.

## Observations

Our observation was made on a street beside a building at Rikkyo University, Toshima, Tokyo, Japan (35°44'N 139°42'E). Although the university campus is located in an urban area it has some open grounds with tall trees. Great Tits inhabit the campus year-round and nest in tree cavities from April to July.

We saw a Great Tit lying on the ground flapping its wings at 11h10 (Japan Standard Time) on 16 March 2010. Immediately, another Great Tit approached, swooped on, pushed and shoved the lying tit. The aggressor stuck its beak into the eyes of the other bird and plucked feathers from its back and abdomen. The